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10/518,041	12/15/2004	Robert Lewis Clarke	100770.0016US1	2712

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EXAMINER	
BEST, ZACHARY P	

ART UNIT	PAPER NUMBER
4191	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/518,041	CLARKE, ROBERT LEWIS	
	Examiner	Art Unit	
	Zachary Best	4191	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 December 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11* is/are pending in the application.

4a) Of the above claim(s) *12-20* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 December 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *12152004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

ZINC AIR BATTERY WITH ACID ELECTROLYTE

Examiner: Z. Best S.N. 10/518,041 Art Unit: 4191 February 14, 2008

Election / Restriction

1. Restriction is required under 35. U.S.C. 121 and 372 because this application contains the following inventions or group of inventions that have lack of unity because they are not within a single general inventive concept under PCT Rule 13.1:

Group I, Claims 1-11, drawn to a battery comprising an acid electrolyte, classified in class 429, subclass 188.

Group II, Claims 12-15, drawn to a battery comprising an acid electrolyte, wherein said electrolyte further comprises methane sulfonic acid, classified in class 429, subclass 204.

Group III, Claims 16-20, drawn to a battery comprising a static catholyte and a static acidic anolyte, classified in class 420, subclass 188.

2. The inventions listed as Groups I-III do not relate to a single general inventive concept under PCT Rule 13.1 because under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

Group I is separate from the other groups because it requires an acid electrolyte in which oxygen and a dendrite-forming metal form a redox pair.

Group II is separate from the other groups because it requires an acid electrolyte comprising methane sulfonic acid, and zinc and oxygen forming a redox pair. None of the other groups claims these features.

Group III is separate from the other groups because it requires a static catholyte and a static acidic anolyte. None of the other groups claims these features.

3. During a telephone conversation with Mr. Martin Fesschmaier on January 16, 2008 a provisional election was made without traverse to prosecute the invention of Group I, Claims 1-11. Affirmation of this election must be made by applicant in replying to this Office action. Claims 12-20 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-2, and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Blurton et al. (U.S. Patent No. 4,220,690 A).

Blurton et al. teach a zinc/air battery comprising an acid electrolyte in which oxygen and a dendrite-forming metal form a redox pair (claim 1), and wherein the acidity of the

electrolyte is provided at least in part by a compound that reduces dendrite formation during charging (col. 1, lines 20-21).

Regarding Claim 2, Blurton et al. teach the dendrite-forming metal is zinc (claim 1).

Regarding Claim 8, Blurton et al. teach the dendrite-forming metal forms a complex with the compound when the battery discharges (col. 3, lines 28-33, zinc sulfate being the complex).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claim 3 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Blurton et al., as applied to Claim 1-2, and 8 above, and in further view of Armstrong (U.S. Patent No. 4,066,823 A).

Blurton et al. teach a zinc/air battery as recited in Paragraph 5 above. However, Blurton et al. fail to teach said compound comprises an organic acid.

Armstrong teaches a zinc/air battery comprising an acid electrolyte in which oxygen and a dendrite-forming metal form a redox pair (col. 1, lines 10-15, form a metal-air battery), wherein a benzene sulfonic acid (organic acid) is provided in the electrolyte (col. 5, lines 33-34). Armstrong further teaches the use of specific organic acids because they have a low

enough vapor pressure that it does not volatilize into the gaseous phase (col. 5, lines 43-54). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to create the battery of Blurton et al. with an organic acid because Armstrong teach resultant low vapor pressure from the electrolyte.

Regarding Claim 9, Blurton et al. teaches zinc forms a complex with the compound when the battery discharges as recited in Paragraph 5 above.

8. Claims 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Blurton et al. and Armstrong, as applied to Claims 3 and 9 above, and in further view of Harada et al. (U.S. Patent No. 6,428928 B1).

Blurton et al. and Armstrong teach a zinc/air battery as recited in Paragraph 7 above. However, Blurton et al. and Armstrong fail to teach said compound comprises a methane sulfonic acid or one of the group consisting of polyvinyl sulfonic acid, polyvinyl sulfuric acid, and sulfurous acid.

Harada et al. teach an electrolyte for use in a battery (col. 1, lines 8-13), wherein the electrolyte comprises an organic acid (col. 8, lines 36-55). Harada et al. further teach the functional equivalency of benzene sulfonic acid with methane sulfonic acid and polyvinyl sulfonic acid (col. 8, lines 48-55). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute polyvinyl sulfonic acid or methane sulfonic acid for the benzene sulfonic acid in the electrolyte disclosed by

Armstrong in the battery of Blurton et al. and Armstrong because of the aforesaid functional equivalency.

9. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Blurton et al. (U.S. Patent No. 4,220,690 A), as applied to Claim 1-2, and 8 above, and in further view of Awano (JP 57-101359 A).

Blurton et al. teach a battery as recited in Paragraph 5 above. However, Blurton et al. fail to teach said compound comprising a zinc brightener.

Awano teach a battery in which a dendrite-forming metal (zinc) is used as a redox pair, and a brightener for zinc plating may be used as a dendrite inhibitor (abstract). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to create the battery of Blurton et al. with a zinc brightener because Awano teach the use of the brightener to prohibit dendrite formation.

10. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Blurton et al. and Awano, as applied to Claim 6 above, and in further view of Popescu (U.S. Patent No. 4,226,682 A).

Blurton et al. and Awano teach a battery as recited in Paragraph 9 above. However, Blurton et al. and Awano fail to teach said compound zinc brightener is from the group consisting of an aromatic monocarboxylic acid, an aromatic aldehyde, and a polyhydric alcohol having ethoxylated or propoxylated hydroxyl groups.

Popescu teach a zinc brightener comprising an aromatic monocarboxylic acid (col. 4, lines 58-63) or aromatic aldehydes (col. 5, line 21). Popescu further teach that the functions of the brightener may be better controlled with the above compounds (col. 4, lines 52-57 and col. 5, lines 38-41). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to create the battery of Blurton et al. and Awano with a brightener of an aromatic monocarboxylic acid or aromatic aldehyde because Popescu teach the use of such brightener to enhance the uniformity and brilliance of the zinc deposit.

11. Claims 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Blurton et al., as applied to Claim 1-2, and 8 above, and in further view of Heinke (EP 644275 A1).

Blurton et al. teach a battery as recited in Paragraph 5 above. However, Blurton et al. fail to teach an electrode or bipolar electrode comprising a Magnelli phase titanium suboxide.

Regarding Claim 10, Heinke teach an electrode material comprising a Magnelli phase titanium suboxide for use as an electrode (abstract). Heinke further teach that the electrode as taught creates an essentially even surface for electrochemical purposes (paragraph 1). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to create the battery of Blurton et al. with an electrode comprising a Magnelli phase titanium suboxide because Heinke teach resultant even surfaces for electrochemical purposes.

Regarding Claim 11, Heinke further teach an electrode material comprising a Magnelli phase titanium suboxide for use as a bipolar electrode (abstract).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zachary Best whose telephone number is (571) 270-3963. The examiner can normally be reached on Monday to Thursday, 7:30 - 5:00 (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dah-Wei Yuan can be reached on (571) 272-1295. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Zpb

/Dah-Wei D. Yuan/
Supervisory Patent Examiner, Art Unit 4191